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Energy relaxation time of an rf SQUID flux qubit[1] SHAOXIONG LI, WEI QIU, MATTHEW MATHENY, ZHONGYUAN ZHOU, SIYUAN HAN, Department of Physics and Astronomy, University of Kansas — Energy relaxation is one of the main decoherence mechanisms in superconducting flux qubits. In this work we measured the energy relaxation time in an rf SQUID qubit for which all of the important parameters were determined independently from thermal activation, MQT, and microwave spectroscopy measurements. The quasi-static flux biases were adjusted to have only three energy levels involved in the microwave pump- probe experiment, a situation most relevant to three-level quantum state manipulations. The result shows that the characteristic time of energy relaxation from the excited state to the ground state of the qubit is about 3.6 μs. This result indicates that the dominating sources of damping were the qubit's flux bias and state readout circuitry..

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Shaoxiong Li
Department of Physics and Astronomy, University of Kansas

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